REMARKS

This is in response to the Office Action mailed on April 4, 2005, in which claims 1-24 were pending. Claims 20-24 were allowed, and claims 4, 8, 17 and 18 were rejected as dependent upon a rejected base claim but were noted to define patentable subject matter. Claims 1-3, 5-7, 9-16 and 19 were rejected as anticipated by Tekalp, US Pat. No. 5,654,771. With this amendment, claims 1, 20 and 21 are amended to correct typographic errors and provide antecedent basis for the term "source triangles", without changing the scope of these claims. New claim 25 is added. As explained further below, all of claims 1-25 are in condition for allowance, and reconsideration and notice to that effect are respectfully requested.

The present invention relates to an image encoding method based on the implementation of invertible mathematical transformations. More precisely, the invention provides a method for implementing an invertible mathematical transformation based on partitioning at least a portion of an image into triangles, whereas at the present time the main approaches using transformations imply a partitioning into square blocks. The specificity of the invention rests on the fact that it is easier and more efficient to break down an image into triangles, however it is no longer possible to apply any mathematical transformations to these triangles like a DCT. Therefore, according to the invention, when the breakdown of an image into triangles has been performed, a square matrix is associated to each of these triangles, for instance by the means of an affine transformation to obtain a rectangular isoceles triangle. Then, it is possible to apply a standard mathematical transformation to the obtained square matrix.

The Office Action rejected claims 1-3, 5-7, 8-16 and 19 as anticipated by Tekalp, U.S. Pat. No. 6,654,771 (sic, 5,654,771). However, Tekalp does not disclose or suggest the invention as defined by claim 1. The Office Action has only selected several parts of the Tekalp document, which are read independently and without taking into account the context, to be opposed to the claims which require dependence between the steps. TEKALP discloses a technique for data compression of video signals with constant rate, by estimating the motion vector between two consecutive frames. It is true that the Tekalp technique is based on the breakdown of a video frame into triangles (figure

5 for instance), and that Tekalp teaches the application of an affine transformation to these triangles (column 10, line 10-43). Different operations are performed, including a matrix computation (column 11) to estimate the coordinates of the motions vectors. In another, separate part of the Tekalp document, it is proposed (column 16, line 5 for instance) to apply a DCT to some special regions called "failure regions". The "failure regions" are not the same as Tekalp's breakdown of the video frame into triangles. Tekalp states, for instance, "A **rectangular** coordinate array of pixels of the uncompressed second image frame is determined as an enclosing **rectangle** for each off the MF and UB regions, and each enclosing **rectangle** is partitioned into **8x8 blocks** of adjoining sub-arrays." (Co. 15, line 45-49, emphasis added).

Thus, these separate features of Tekalp do not correspond to the invention as claimed. That is, the Office Action misinterprets the different parts of the Tekalp document, in order to identify the three steps of claim 1. Applicant admits that Tekalp discloses a breakdown into triangles, and then applies an affine transformation to these triangles (the first step of claim 1). However, Tekalp does not disclose or suggest applying any mathematical transformation that is usually processed onto square blocks to the data which represents these triangles (the third step of claim 1). In return, this is the novelty and non-obviousness of the present invention. Indeed, the segmentation into triangles and the use of a mathematical transformation is already known, but the use of both techniques together, i.e., use of the mathematical transformation on the information representing the triangles, is not obvious. To make it possible, it is necessary to associate to each triangle a square matrix (the second step of claim 1). Associating a square matrix to each triangle to is not disclosed nor suggested in Tekalp. Instead, the square matrix of Tekalp pointed out by the Office Action (see column 16) is not representative of triangles, but enables the estimation of the motion vectors. Further, the Tekalp motion vector matrix is not determined with the process described in the dependent claims. In other words, the technique disclosed in Tekalp does not disclose any computation of a transformed matrix representative of an original triangle at the end of the process. Especially, the specific use of a DCT (column 16) disclosed in Tekalp does not correspond to the one proposed in claim 1. In view of this, it is evident that claim 1 and dependent claims are novel and

non obvious over Tekalp.

In summary, the present invention is not obvious in view of Tekalp. The Office Action resorts to combining several independent parts of Tekalp to support the rejection, but no link between these parts can be found to suggest the interrelated steps of claim 1. On the contrary:

- there is no disclosure of the second step of claim 1, association of a square matrix to each triangle (Tekalp rather discloses use of a square matrix for motion estimation); and
- there is therefore no disclosure of the third step of claim 1, transformation (such as DCT) of such a square matrix in another, transformed square matrix, which is representative of the original triangle (in a decorrelated form, i.e. with a reduced amount of data for describing the triangle).

Additionally, Applicant notes that the European patent has already been granted on the invention, with corresponding claims. A copy of EP 1,181,668 B1 is attached hereto.

Applicant respectfully thanks the Examiner for the allowance and/or indicated allowability of the invention as defined by claims 4, 8, 17, 18 and 20-24. These claims have not been substantively amended and remain patentable.

New claim 25 merely clarifies that each transformed matrix corresponds to one of said source triangles. Tekalp neither discloses nor suggests the application of a second decorrelating invertible transformation to each of said square matrices, thereby delivering transformed matrices, when each transformed matrix corresponds to one of the source triangles.

The application containing pending claims 1-25 is in condition for allowance. Reconsideration and notice to that effect is respectfully requested. The Examiner is invited to contact the undersigned at the telephone number listed below if such a call would in any way facilitate allowance of the application.

Respectfully submitted,

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